



# Search Report

EIC 2800

STIC Database Tracking Number

To: FORREST PHILLIPS  
Location: JEF-10A64  
Art Unit: 2837  
Wednesday, June 18, 2008

Case Serial Number: 10/560777

From: RAJ PATEL  
Location: EIC2800  
JEF-4B68 / JEF-4A58  
Phone: (571)272-6231

raj.patel@uspto.gov

## Search Notes

RE: Diaphragm of a speaker made of Foam and reinforced or wound by wires.

Attached are the search histories and edited search results from the following databases:

DIALOG – European and WIPO/PCT patents Full Text

DIALOG – Multiple Databases

EAST – USPat, USPGPUB, DERWENT, EPO, JPO and IBM\_TDB

The attached documents may include articles showing speaker Diaphragms made of foam and embedded with reinforcing members such as fibers, wires, yarns etc.

I recommend that you review all the attached results.

If you like more searching on this case or have questions or comments, please feel free to let me know.

Best Regards,  
Raj.

**Suggs, Faye (ASRC)**

263112

**From:** FORREST PHILLIPS [forrest.phillips@uspto.gov]  
**Sent:** Tuesday, June 10, 2008 5:48 PM  
**To:** STIC-EIC2800  
**Cc:** NPL Feedback  
**Subject:** Database Search Request, Serial Number: 10560777

JUN 11 2008

**Requester:** FORREST PHILLIPS (P/2837)  
**Art Unit:** P/2837  
**Employee Number:** 82254  
**Office Location:** JEF 10A64  
**Phone Number:** (571)272-9020  
**Mailbox Number:**

**Case serial number:** 10560777  
**Class / Subclass(es):** 181/174  
**Earliest Priority Filing Date:** 6/07/04  
**Format preferred for results:** E-mail  
**Attachment:** No.  
**Search Topic Information:**

a diaphragm for a speaker, made of foam and having wires or thelike wound about the foam block to strength it in one direction, that of the axial movement. I have found foam diaphragms but nothing teaching the use of windings to strengthen the ofam in one direction. Transducers, be it microphone or speaker would be best but other instances of the foam being strengthened like that are also good. Thanks  
**Special Instructions and Other Comments:**



## VOLUNTARY SEARCH FEEDBACK

Art Unit \_\_\_\_\_

App./Serial # \_\_\_\_\_

### **Relevant prior art found**

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest
- ☐ Helped better understand invention
- ☐ Helped better understand state of the art in technology

Types ☐ Foreign Patent(s) ☐ Non-Patent Literature

### **Relevant prior art not found**

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining the patentability or understanding of the invention.

### **COMMENTS** (click below to type)

Questions about the scope or the results of the search?

Contact your EIC searcher or EIC Supervisor.

Please submit completed form to your EIC

### **STIC USE ONLY**

12/07

Today's Date \_\_\_\_\_

Additional Notes if applicable (please indicate all actions including emails, phone calls, and individuals assisting):

Search  
Histories  
Follow  
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? b 348,349

[File 348] **EUROPEAN PATENTS 1978-2007/ 200824**

(c) 2008 European Patent Office. All rights reserved.

[File 349] **PCT FULLTEXT 1979-2008/UB=20080605 UT=20080529**

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Holding session beginning: 6/17/2008 1:26:09 PM

Set Items Description

- S1 25360 S (DIAPHRAGM?? OR MEMBRANE?? OR LAMINA???? OR COVER???? OR RESONAT???? OR DISK???? OR PARTITION????)(SN)(FOAM??? OR POLYSTYRENE OR CARDBOARD?? OR CARD()BOARD?? OR SPONG???? OR ((POROUS OR NONPOROUS OR MICROPOROUS)(2N)(MATERIAL?? OR SHEET?? OR BOARD????))
- S2 22262 S (WIRE??? OR WIRING?? OR TAPE?? OR FIBER?? OR FIBRE?? OR COIL???? OR CORD?? OR CABLE?? OR STRAND?? OR FILAMENT????)(SN)(WOUND???? OR WINDING?? OR WIND?? OR WRAP???? OR ROLL???? OR BOUND????)(SN)(STRENGTH???? OR REINFORC???? OR RE()INFORC???? OR REENFORC???? OR RE()ENFORC???? OR STIFFEN???? OR GUARD???? OR SAFEGUARD???? OR PROTECT???? OR SHIELD???? OR SUPPORT???? OR FORTIF???? OR STABIL????)
- S3 865 S IC=(H04R-?? OR H04R-0?? OR H04R-00?? OR H04R000??)
- S4 0 S S3(SN)(FOAM??? OR POLYSTYRENE OR CARDBOARD?? OR CARD()BOARD?? OR SPONG???? OR ((POROUS OR NONPOROUS OR MICROPOROUS)(2N)(MATERIAL?? OR SHEET?? OR BOARD????))
- S5 1364 S S1 AND S2
- S6 153 S S5 AND (SPEAKER?? OR LOUDSPEAKER?? OR MICROPHONE?? OR MICRO()PHONE?? OR TRANSDUCER?? OR WOOFER?? OR SUBWOOFER?? OR ACOUST???? OR SOUND????)
- S7 117 S S6 AND PY<=2004
- S8 8 S S7 AND (SPEAKER?? OR LOUDSPEAKER?? OR MICROPHONE??)/TI
- S9 1 S S7 AND (DIAPHRAGM??)/TI

[File 610] **Business Wire** 1999-2008/Jun 17

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*\*File 610: File 610 now contains data from 3/99 forward. Archive data (1986-2/99) is available in File 810.*

[File 613] **PR Newswire** 1999-2008/Jun 17

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*\*File 613: File 613 now contains data from 5/99 forward. Archive data (1987-4/99) is available in File 813.*

[File 621] **Gale Group New Prod.Annou.(R)** 1985-2008/May 29

(c) 2008 The Gale Group. All rights reserved.

[File 649] **Gale Group Newswire ASAP(TM)** 2008/May 29

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[File 810] **Business Wire** 1986-1999/Feb 28

(c) 1999 Business Wire. All rights reserved.

[File 813] **PR Newswire** 1987-1999/Apr 30

(c) 1999 PR Newswire Association Inc. All rights reserved.

[File 9] **Business & Industry(R)** Jul/1994-2008/Jun 09

(c) 2008 The Gale Group. All rights reserved.

[File 16] **Gale Group PROMT(R)** 1990-2008/Jun 10

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*\*File 16: Because of updating irregularities, the banner and the update (UD=) may vary.*

[File 47] **Gale Group Magazine DB(TM)** 1959-2008/Jun 04

(c) 2008 The Gale group. All rights reserved.

[File 80] **TGG Aerospace/Def.Mkts(R)** 1982-2008/Jun 10

(c) 2008 The Gale Group. All rights reserved.

[File 93] **TableBase(R) Sep** 1997-2008/Jun W2

(c) 2008 The Gale Group. All rights reserved.

[File 111] **TGG Natl.Newspaper Index(SM)** 1979-2008/May 27

(c) 2008 The Gale Group. All rights reserved.

[File 112] **UBM Industry News** 1998-2004/Jan 27

(c) 2004 United Business Media. All rights reserved.

[File 116] **Brands & Their Companies** 2007/Aug

(c) 2007 Gale Research Inc. All rights reserved.

[File 141] **Readers Guide** 1983-2008/Apr

(c) 2008 The HW Wilson Co. All rights reserved.

[File 148] **Gale Group Trade & Industry DB** 1976-2008/May 28

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*\*File 148: The CURRENT feature is not working in File 148. See HELP NEWS148.*

[File 149] **TGG Health&Wellness DB(SM)** 1976-2008/Jun W1

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[File 160] **Gale Group PROMT(R)** 1972-1989

(c) 1999 The Gale Group. All rights reserved.

[File 177] **Adv.& Agency Red Books:Advertisers** 2008/May

(c) 2008 Reed Elsevier Inc. All rights reserved.

[File 178] **Adv.& Agency Red Books:Agencies** 2008/May

(c) 2008 Reed Elsevier Inc. All rights reserved.

[File 188] **Health Devices Sourcebook** 2007

ECRI (A nonprofit agency). All rights reserved.

[File 198] **Health Devices Alerts(R)** 1977-2007/May W3

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[File 211] **Gale Group Newsearch(TM)** 2008/May 28

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[File 256] **TecInfoSource** 82-2008/Jun

(c) 2008 Info.Sources Inc. All rights reserved.

[File 275] **Gale Group Computer DB(TM)** 1983-2008/Jun 10

(c) 2008 The Gale Group. All rights reserved.

[File 482] **Newsweek** 2000-2008/Jun 09

(c) 2008 Newsweek, Inc. All rights reserved.

[File 484] **Periodical Abs Plustext** 1986-2008/May W4

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[File 535] **Thomas Register Online(R)** -2008/Q1

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[File 571] **Piers Exports(US Ports)** 2008/Jun W3

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[File 573] **Piers Imports(US Ports)** 2008/Jun W2

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[File 583] **Gale Group Globalbase(TM)** 1986-2002/Dec 13

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*\*File 583: This file is no longer updating as of 12-13-2002.*

[File 584] **KOMPASS USA** 2007/JUL

(c) 2007 KOMPASS International. All rights reserved.

[File 585] **KOMPASS Middle East/Africa/Mediterr** 2007/JUL

(c) 2007 KOMPASS Intl. All rights reserved.

[File 586] **KOMPASS Latin America** 2007/APR

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[File 590] **KOMPASS Western Europe** 2008/FEB

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[File 592] **KOMPASS Asia/Pacific** 2007/JUL

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[File 593] **KOMPASS Central/Eastern Europe** 2007/JUL

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\*File 609: This file is closed.

[File 636] Gale Group Newsletter DB(TM) 1987-2008/Jun 11

(c) 2008 The Gale Group. All rights reserved.

[File 646] Consumer Reports 1982-2008/Apr

(c) 2008 Consumer Union. All rights reserved.

[File 647] CMP Computer Fulltext 1988-2008/Jun W1

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Set	Items	Description
S1	14607	S (DIAPHRAGM?? OR MEMBRANE?? OR LAMINA????? OR COVER????? OR RESONAT????? OR DISK????? OR PARTITION?????)(5N)(FOAM??? OR POLYSTYRENE OR CARDBOARD?? OR CARD()BOARD?? OR SPONG????? OR ((POROUS OR NONPOROUS OR MICROPOROUS)(2N)(MATERIAL?? OR SHEET?? OR BOARD???))
S2	8671	S (WIRE??? OR WIRING?? OR TAPE?? OR FIBER?? OR FIBRE?? OR COIL????? OR CORD?? OR CABLE?? OR STRAND?? OR FILAMENT????)(5N)(WOUND????? OR WINDING?? OR WIND?? OR WRAP????? OR ROLL????? OR BOUND?????)(5N)(STRENGTH????? OR REINFORC????? OR RE()INFORC????? OR REENFORC????? OR RE()ENFORC????? OR STIFFEN????? OR GUARD????? OR SAFEGUARD????? OR PROTECT????? OR SHIELD????? OR SUPPORT????? OR FORTIF????? OR STABIL?????)
S3	42	S S1 AND S2 AND (SPEAKER?? OR LOUDSPEAKER?? OR MICROPHONE?? OR MICRO()PHONE?? OR TRANSDUCER?? OR WOOFER?? OR SUBWOOFER?? OR ACOUST????? OR SOUND?????)
S4	26	S S3 AND PY <=2004



## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S3	1	"20060137935"	US-PGPUB	OR	ON	2008/06/13 10:13
S4	2	"20060137935"	US-PGPUB ; DERWENT	OR	ON	2008/06/12 13:04
S5	1	"3841197".pn.	US-PGPUB ; USPAT	OR	ON	2008/06/16 12:41
S6	2	{"4410768" "6097829").pn.	US-PGPUB ; USPAT	OR	ON	2008/06/13 10:21
S7	2	diaphragm\$2 with (speaker\$2 or loudspeaker\$2 or microphone\$2 or transducer\$2) with foam\$2 with (strength\$5 or reinforce\$5 or reinforce\$5) with (wire\$2 or wound\$3 or wind\$4 or yarn\$2 or ribbon\$2 or tape\$2)	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/13 15:20
S8	1	("2934612").URPN.	USPAT	OR	OFF	2008/06/13 10:32
S9	34	diaphragm\$2 with (speaker\$2 or loudspeaker\$2 or microphone\$2 or transducer\$2) with foam\$2 with (strength\$5 or reinforce\$5 or reinforce\$5)	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/13 10:38
S10	24	diaphragm\$2 with (speaker\$2 or loudspeaker\$2 or microphone\$2 or transducer\$2) with foam\$2 with (wire\$2 or wound\$3 or wind\$4 or yarn\$2 or ribbon\$2 or tape\$2)	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 12:11
S11	59	diaphragm\$2 with (speaker\$2 or loudspeaker\$2 or microphone\$2 or transducer\$2) with (strength\$5 or reinforce\$5 or reinforce\$5) with (wire\$2 or wound\$3 or wind\$4 or yarn\$2 or ribbon\$2 or tape\$2)	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/13 15:20

## EAST Search History

S12	57	S11 not S10	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 11:25
S13	2	"57025793"	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 10:54
S14	1	"20020146145"	US-PGPUB	OR	ON	2008/06/16 11:27
S15	1	"0078091"	EPO; DERWENT	OR	ON	2008/06/16 11:27
S16	1	2001-475540.NRAN.	DERWENT	OR	OFF	2008/06/16 11:34
S17	22	{stuart near2 nevill}.in.	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/06/16 11:39
S18	72	((B near2 W) near2 (loudspeaker\$2 or group\$2)).as.	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/06/16 11:40
S19	57	S18 not S17	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/06/16 11:40
S20	2	"2003174694"	US-PGPUB ; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 12:11

## EAST Search History

S21	2	{speaker\$2 or loudspeaker\$2 or loud adj speaker\$2 or microphone\$2 or micro adj phone\$2 or transducer\$2) with (Diaphragm\$2 or membrane\$2 or lamina\$5 or cover\$4) with (foam\$3 or polystyrene) with (winding\$2 or wound\$3 or bound\$4 or tensile or mono\$1filament) with (strength\$5 or reinforc\$4 or re adj inforc\$4 or reenforc\$4 or re adj enforce\$4 or stiffen\$4 or safeguard\$4 or protect\$4 or shield\$4 or support\$4 or fortif\$4 or stabili\$5)	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 12:47
S22	9	{speaker\$2 or loudspeaker\$2 or loud adj speaker\$2 or microphone\$2 or micro adj phone\$2 or transducer\$2) with (Diaphragm\$2 or membrane\$2 or lamina\$5 or cover\$4) with (foam\$3 or polystyrene) with (winding\$2 or wound\$3 or bound\$4 or tensile or mono\$1filament) with (strength\$5 or reinforc\$4 or re adj inforc\$4 or reenforc\$4 or re adj enforce\$4 or stiffen\$4 or safeguard\$4 or protect\$4 or shield\$4 or support\$4 or fortif\$4 or stabili\$5)	US-PGPUB ; USPAT	OR	ON	2008/06/16 12:50

## EAST Search History

S23	48	(speaker\$2 or loudspeaker\$2 or loud adj speaker\$2 or microphone\$2 or micro adj phone\$2 or transducer\$2) with (Diaphragm\$2 or membrane\$2 or lamina\$5 or cover\$4) with (foam\$3 or polystyrene) with (wire\$3 or wiring\$2 or wound\$4 or winding\$2 or tape\$2 or ribbon\$2 or yarn\$2 or fiber\$2 or fibre\$2 or resin\$2 or warp\$2 or coil\$4 or cable\$2 or monofilament\$2 or mono adj filament\$2 or line\$2 or cord\$2 or tow or elongate\$4 or strand\$2 or filament\$2 or flexible or tensile or bound\$4) with (strength\$5 or reinforce\$4 or re adj inforc\$4 or reenforc\$4 or re adj enforce\$4 or stiffen\$4 or safeguard\$4 or protect\$4 or shield\$4 or support\$4 or fortif\$4 or stabili\$5)	US-PGPUB ; USPAT	OR	ON	2008/06/16 13:36
S24	39	S23 not S22	US-PGPUB ; USPAT	OR	ON	2008/06/16 12:52
S25	34	(speaker\$2 or loudspeaker\$2 or loud adj speaker\$2 or microphone\$2 or micro adj phone\$2 or transducer\$2) with (Diaphragm\$2 or membrane\$2 or lamina\$5 or cover\$4) with (foam\$3 or polystyrene) with (wire\$3 or wiring\$2 or wound\$4 or winding\$2 or tape\$2 or ribbon\$2 or yarn\$2 or fiber\$2 or fibre\$2 or resin\$2 or warp\$2 or coil\$4 or cable\$2 or monofilament\$2 or mono adj filament\$2 or line\$2 or cord\$2 or tow or elongate\$4 or strand\$2 or filament\$2 or flexible or tensile or bound\$4) with (strength\$5 or reinforce\$4 or re adj inforc\$4 or reenforc\$4 or re adj enforce\$4 or stiffen\$4 or safeguard\$4 or protect\$4 or shield\$4 or support\$4 or fortif\$4 or stabili\$5)	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:04

## EAST Search History

S26	10	(speaker\$2 or loudspeaker\$2 or loud adj speaker\$2 or microphone\$2 or micro adj phone\$2 or transducer\$2) with (Diaphragm\$2 or membrane\$2 or lamina\$5 or cover\$4) with (foam\$3 or polystyrene) with (wire\$3 or wiring\$2 or tape\$2 or ribbon\$2 or yarn\$2 or fiber\$2 or fibre\$2 or resin\$2 or warp\$2 or coil\$4 or cable\$2 or monofilament\$2 or mono adj filament\$2 or line\$2 or cord\$2 or tow or elongate\$4 or strand\$2 or filament\$2 or flexible or tensile or bound\$4) with (strength\$5 or reinforce\$4 or re adj inforc\$4 or reenforc\$4 or re adj enforce\$4 or stiffen\$4 or safeguard\$4 or protect\$4 or shield\$4 or support\$4 or fortif\$4 or stabili\$5) with (wound\$4 or winding\$2 or wind or wrap\$4 or roll\$4)	US-PGPUB ; USPAT	OR	ON	2008/06/16 13:38
S27	3	(speaker\$2 or loudspeaker\$2 or loud adj speaker\$2 or microphone\$2 or micro adj phone\$2 or transducer\$2) with (Diaphragm\$2 or membrane\$2 or lamina\$5 or cover\$4) with (foam\$3 or polystyrene) with (wire\$3 or wiring\$2 or tape\$2 or ribbon\$2 or yarn\$2 or fiber\$2 or fibre\$2 or resin\$2 or warp\$2 or coil\$4 or cable\$2 or monofilament\$2 or mono adj filament\$2 or line\$2 or cord\$2 or tow or elongate\$4 or strand\$2 or filament\$2 or flexible or tensile or bound\$4) with (strength\$5 or reinforce\$4 or re adj inforc\$4 or reenforc\$4 or re adj enforce\$4 or stiffen\$4 or safeguard\$4 or protect\$4 or shield\$4 or support\$4 or fortif\$4 or stabili\$5) with (wound\$4 or winding\$2 or wind or wrap\$4 or roll\$4)	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:49

## EAST Search History

S28	0	winding\$2 with strengthen\$4 with foam with diaphragm\$2	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:50
S29	0	winding\$2 with strength\$6 with foam with diaphragm\$2	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:50
S30	1	winding\$2 with foam with diaphragm\$2	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:50
S31	0	diaphragm\$2 with winding\$2 with strength\$6 with foam\$3	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:52
S32	1	"0078091"	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/06/16 13:52

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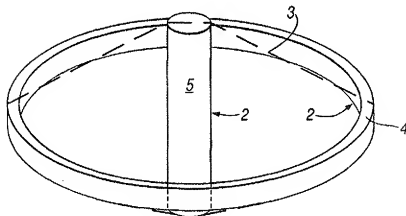
(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
21 December 2000 (21.12.2000)

PCT

(10) International Publication Number  
WO 00/78091 A2

- (51) International Patent Classification: H04R 1/00 (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (21) International Application Number: PCT/GB00/02289
- (22) International Filing Date: 13 June 2000 (13.06.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 9913835.6 14 June 1999 (14.06.1999) GB
- (71) Applicant (for all designated States except US): B & W LOUDSPEAKERS LIMITED [GB/GB]; Meadow Road, Worthing BN11 2RX (GB).
- (72) Inventor; and  
(75) Inventor/Applicant (for US only): NEVILL, Stuart, Michael [GB/GB]; 252 Bellegrave Road, Welling, Kent DA16 3RT (GB).
- (74) Agents: NETTLETON, John, Victor et al.; Abel & Imray, 20 Red Lion Street, London WC1R 4PQ (GB).
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TO).
- Published:  
— Without international search report and to be republished upon receipt of that report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: STIFFENED MEMBRANE ASSEMBLIES



(57) Abstract: A stiffened membrane assembly for use as the diaphragm of a loudspeaker drive unit or as a wall of a loudspeaker enclosure comprises a frame (2) and a multiplicity of tensile members (3) spanning the frame (2) and acting in tension on it, the frame and tensile members having a membrane attached thereto.

PAGE 1 OF 2



4/4

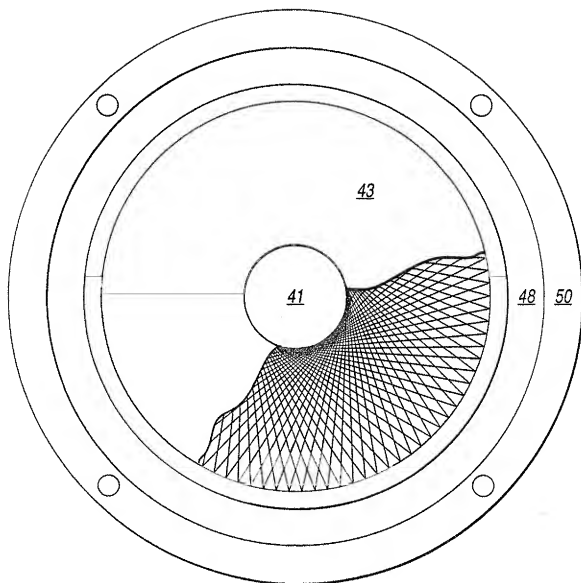


Fig.6

PAGE 2 OF 2

CASE # 10/560,777

PAT-NO: JP02003174694A  
DOCUMENT- JP 2003174694 A  
IDENTIFIER:  
TITLE: DIAPHRAGM FOR SPEAKER, SPEAKER, AND DIAPHRAGM FOR PANEL  
MICROPHONE

PUBN-DATE: June 20, 2003

INVENTOR-INFORMATION:

NAME	COUNTRY
ONO, HIDEO	N/A
SHICHIMA, KIYOTAKA	N/A
NAITO, MASATO	N/A

JP 2003174694

ASSIGNEE-INFORMATION:

NAME	COUNTRY
JSP CORP	N/A

APPL-NO: JP2001372777

APPL-DATE: December 6, 2001

INT-CL (IPC): H04R007/02 , H04R007/04

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a diaphragm used for a speaker and having superior lightweight and elastic modulus in tension as well as good energy internal loss, a diaphragm used for a flat speaker and having low sound distortion, superior omnidirection, and flat frequency response even in a wide reproducing band, the speakers using the diaphragms, and a diaphragm for a panel microphone.

SOLUTION: The diaphragm used for the speaker is formed by laminating a reinforced fiber-containing fiber -reinforced thermoplastic resin sheet continuously arranged in the unidirection or in the orthogonally intersected bidirection on a base material selected from a thermoplastic resin foam, a cardboard, or a corrugated board and having a thickness of 0.5 to 50 mm and a weight per unit area of 50 to 2,000 g/m

COPYRIGHT: (C) 2003, JPO

CASE # 10/560,777

US-PAT-NO: 5033093  
DOCUMENT-IDENTIFIER: US 5033093 A  
TITLE: Compact microphone and method of manufacture  
DATE-ISSUED: July 16, 1991

US-CL-CURRENT: 381/177, 181/157, 181/167, 381/163, 381/361

APPL-NO: 07/466599  
DATE FILED: January 17, 1990

Claims Text - CLTX (1):

1. A method of making a dynamic microphone which comprises the steps of forming a diaphragm body of thin synthetic resinous sheet material of high tensile and flexural strength, forming a multi-layer central portion of thin synthetic resinous material and thin wire metal mesh, contacting the central portion centrally of the diaphragm body and integrating while deforming both so that they are domed with the diaphragm body on the concave side of the central portion.

Claims Text - CLTX (5):

5. A method of making a dynamic microphone which comprises the steps of forming a permanent magnet having opposite faces and a high ratio of diameter-to-height, forming a diaphragm body of thin synthetic resinous sheet material of high tensile and flexural strength, forming a multi-layer central portion of thin synthetic resinous material and thin wire metal mesh, contacting the central portion centrally of the diaphragm body and integrating while deforming both so that they are domed with the diaphragm body on the concave side of the central portion, the central portion being less than one-half the total area of the diaphragm body, forming a voice coil having a diameter and a diameter-to-height ratio greater than those of the magnet, affixing the voice coil in circumscribing relation to the domed area and on the convex side thereof, locating the voice coil to surround the magnet, and fixing the periphery of the diaphragm relative to the magnet.

Claims Text - CLTX (12):

12. A compact microphone construction comprising the combination of a diaphragm having a multi-layer laminated, low mass rigid domed central portion including first and second deformable layers and a wire mesh layer adhesively bonded therebetween and a surrounding single layer attachment portion integral with and extending from said second layer, said second layer having high tensile and flexural strength whereby the diaphragm is free to vibrate in a plane normal to the diaphragm, an annular voice coil attached to and circumscribing the domed central portion on the concave side thereof, and a compact magnet assembly including a permeable cup portion having a circular recess with a closed inner wall, an upstanding annular wall portion extending from the inner wall and forming a pole piece, a thin disk shaped fixed permanent magnet disposed within the recess in abutment with the closed wall, and a disk like permeable pole piece disposed over

CASE # 10/560,777

PGPUB-DOCUMENT-NUMBER: 20040131221

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040131221 A1

TITLE: Speaker surround and method for producing the same

PUBLICATION-DATE: July 8, 2004

US-CL-CURRENT: 381/398, 381/424

APPL-NO: 10/676109

DATE FILED: October 2, 2003

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY APPL-NO

DOC-ID

APPL-DATE

JP P2002-289647 2002JP-P2002-289647 October 2, 2002

Detail Description Paragraph - DETX (3):

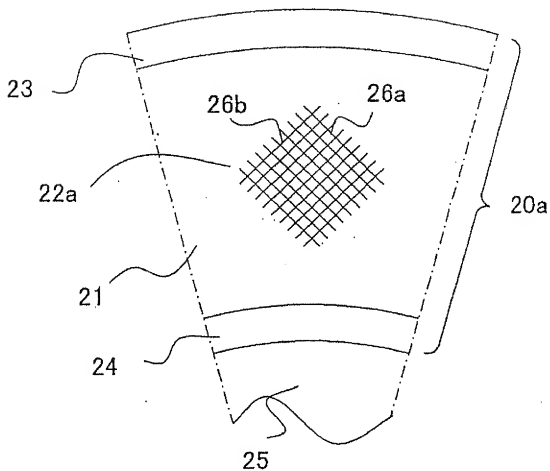
[0022] A speaker surround according to the invention is the one which is installed between a speaker cone paper (diaphragm) and a frame of a speaker, a reinforcing member being equipped inside urethane foam, and the reinforcing member is with no expansion and contraction upon deformation based on displacement of the speaker cone paper.

Claims Text - CLTX (2):

1. A speaker surround arranged between a diaphragm and a frame of a speaker, the speaker surround comprising: a reinforcing member installed inside urethane foam, the reinforcing member being the one with no expansion and contraction upon deformation based on the displacement of the diaphragm.

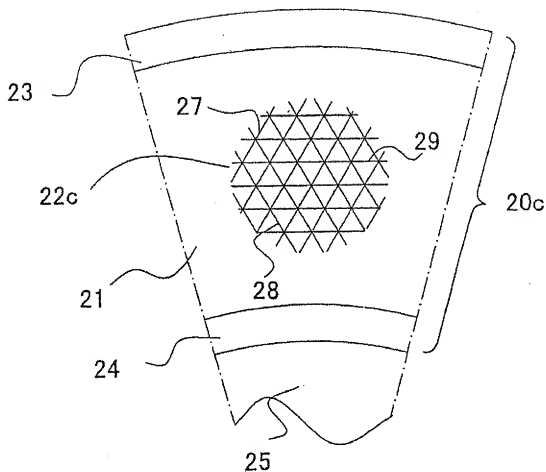
SHEET 1 OF 3

FIG. 3



SHEET 2 OF 2

FIG. 5



SHEET 3 OF 3

CASE # 10/560,777

DERWENT- 1989-336707

ACC-NO:

DERWENT- 198946

WEEK:

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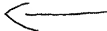
TITLE: Loudspeaker diaphragm consists of fibre -reinforced plastic in which resin is reinforced by three sets of crossed fibre yarns NoAbstract Dwg 2,3/3

PRIORITY-DATA: 1988JP-093972 (April 15, 1988)

PATENT-FAMILY:

PUB-NO PUB-DATE LANGUAGE

JP 01251898 A October 6, 1989 JA



APPLICATION-DATA:

PUB-NO APPL-DESCRIPTOR APPL-NO APPL-DATE

JP 01251898A N/A 1988JP-093972 April 15, 1988

JP 01251898

INT-CL-  
CURRENT:

TYPE IPC DATE

CIPP H04 R 7/02 20060101

Derwent Accession Number - NRAN (1):

1989-336707

Title - TIX (1):

Loudspeaker diaphragm consists of fibre -reinforced plastic in which resin is reinforced by three sets of crossed fibre yarns NoAbstract Dwg 2,3/3

Standard Title Terms - TTX (1):

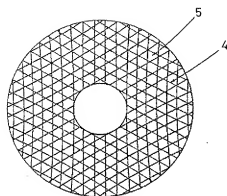
LOUDSPEAKER DIAPHRAGM CONSIST FIBRE REINFORCED PLASTIC RESIN THREE SET CROSS  
YARN NOABSTRACT

SHEET 1 OF 2

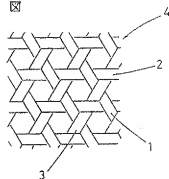
CASE# 10/S60,777

JP  
特開平1-251898(4)

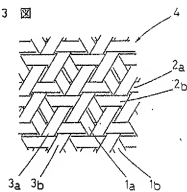
第 1 図



第 2 図



第 3 図



SHEET 2 OF 2



CASE # 10/560,777

DERWENT- 1984-308975  
ACC-NO:  
DERWENT- 198450  
WEEK:

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TITLE: Diaphragm for speaker has plastics foam core, adhering surface plates and reinforcing members across core NoAbstract Dwg 1,2/2

PRIORITY-DATA: 1984JP-064068 (April 15, 1983)

PATENT-FAMILY:

PUB-NO PUB-DATE LANGUAGE  
JP 59191998 A October 31, 1984 JA ←

APPLICATION-DATA:

PUB-NO APPL-DESCRIPTOR APPL-NO APPL-DATE  
JP 59191998A N/A 1984JP-064068 April 15, 1983

INT-CL-  
CURRENT:

TYPE	IPC DATE
CIPP	B32 B 5/18 20060101
CIPS	H04 R 7/02 20060101
CIPS	H04 R 7/10 20060101

Derwent Accession Number - NRAN (1):

1984-308975

Title - TIX (1):

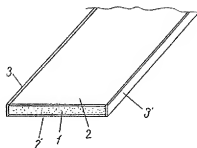
Diaphragm for speaker has plastics foam core, adhering surface plates and reinforcing members across core NoAbstract Dwg 1,2/2

Standard Title Terms - TTX (1):

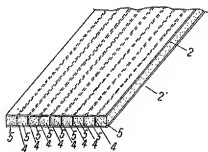
DIAPHRAGM SPEAKER PLASTICS FOAM CORE ADHERE SURFACE PLATE REINFORCED MEMBER  
NOABSTRACT

SHEET 1 OF 2

第 1 図



第 2 図



SHEET 2 OF 2

CASE # 10/560,777

DERWENT- 1982-22702E

ACC-NO:

DERWENT- 198404

WEEK:

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TITLE: Diaphragm for electroacoustic transducer having improved frequency characteristic, consists of mixt. of foamed resin and reinforced fibre such as carbon fibre, glass fibre etc.

PRIORITY-DATA: 1980JP-100857 (July 23, 1980)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
--------	----------	----------

JP 57025793 A	February 10, 1982	JA
---------------	-------------------	----

JP 83058880 B	December 27, 1983	JA
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APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
--------	-----------------	---------	-----------

JP 57025793A	N/A	1980JP-100857	July 23, 1980.
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Derwent Accession Number - NRAN (1):

1982-22702E

Title - TIX (1):

Diaphragm for electroacoustic transducer having improved frequency characteristic, consists of mixt. of foamed resin and reinforced fibre such as carbon fibre, glass fibre etc.

Standard Title Terms - TTX (1):

DIAPHRAGM ELECTROACOUSTIC TRANSDUCER IMPROVE FREQUENCY CHARACTERISTIC CONSIST MIXTURE FOAM RESIN REINFORCED FIBRE CARBON GLASS

CASE # 10/560,777

US-PAT-NO: 2934612  
DOCUMENT-IDENTIFIER: US 2934612 A  
TITLE: Electrostatic speaker

OCR Scanned Text - LPAR (5):

2,934,612 5 the fixed plate it is approaching causes an increase in its attraction to that plate. A correspondingly - increased separation from the other plates weakens the effect upon it of that plate. The resultant of these changes in the electrostatic forces incident to displacement of the diaphragm is to augment the effect of the potential differences which create the driving force. While the invention is here described and claimed in terms of a speaker, it is also useful as a microphone or other transducer to translate sound waves into an electrical wave. I include this within the scope of the claims. Thus, among others, the several objects of the invention as specifically aforementioned, are achieved. Obviously, numerous changes in construction and re-arrangement of parts might be resorted to without departing from the spirit of the invention as defined by the claims. I claim: 1. An electrostatic speaker comprising in combination a frame, a relatively fixed plate which is capable of being charged electrically mounted on said frame, an acoustic element also capable of being electrically charged, granules of material having the characteristics of foam rubber secured to a side of said plate forming individual resilient supports supporting the acoustic element substantially uniformly over its area to hold it away from the surface of the plate and terminal means whereby an electrostatic force can be established between said plate and said acoustic element. 2. An electrostatic speaker in accordance with claim 1, in which the acoustic element is a diaphragm of light, thin, flexible film with high strength to mass ratio. 3. An electrostatic speaker in accordance with claim 1, in which the fixed plate is an acoustically transparent member of electrically conductive material. 4. An electrostatic speaker in accordance with claim 1, in which the fixed plate is composed of woven electrically conductive wires. 5. An electrostatic speaker having two fixed acoustically transparent members and a diaphragm arranged between and parallel to the members, all capable of being electrically charged characterized in that the surfaces of both members are provided with granules of material having the characteristics of foam rubber extending towards the diaphragm and forming individual resilient supports supporting the diaphragm substantially uniformly over its area to hold it away from the surfaces of the members. 6. An electrostatic transducer having two relatively fixed condenser plates, each comprising an acoustically transparent screen woven from electrically conductive wire, a diaphragm disposed between said plates, and granules of material having the characteristics of foam rubber secured to a side of each of said plates forming individual resilient supports supporting the diaphragm substantially uniformly over its area to hold it away from the surface of the plate. 7. An electrostatic transducer comprising in combination a relatively fixed woven electrically conductive wire screen, a second screen identical with said first screen, a diaphragm of light, thin, flexible film having a high strength to mass ratio disposed between said screens and granules of material having the characteristics of foam rubber secured to a side of said first screen and also secured to a side of said second screen, said granules forming individual resilient supports supporting the diaphragm substantially uniformly over its area to hold it away from the surfaces of said screens. References Cited in the file of this patent UNITED STATES PATENTS 11764,008 Crozier June 17, 1930 1,777,170 Kyle June 17, 1930 2,686,847 Aamodt Aug. 17, 1954 FOREIGN PATENTS 695,243 France Sept. 29, 1930 994,075 France Aug. 3, 1951

PAT-NO: JP357073594A  
DOCUMENT-IDENTIFIER: JP 57073594 A  
TITLE: PRODUCTION OF DIAPHRAGM FOR SPEAKER

PUBN-DATE: May 8, 1982

INVENTOR-INFORMATION:

NAME COUNTRY  
SANO, TAKAHISA  
SAKAMOTO, SHIGERU  
SATO, SUSUMU  
ICHIKAWA, SHUICHI

JP 357073594

ASSIGNEE-INFORMATION:

NAME COUNTRY  
FOSTER DENKI KK N/A

APPL-NO: JP55148165

APPL-DATE: October 24, 1980

INT-CL (IPC): H04R007/02 , H04R031/00

US-CL-CURRENT: 381/423 , 381/FOR.162

ABSTRACT:

PURPOSE: To improve the strength of a diaphragm for a speaker by using a foaming agent composed of porous foamed synthetic resin to fuse highly elastic fibers with other materials through the foaming agent and generating firm coupling.

CONSTITUTION: To fuse various fiber materials, thermal expansion microcapsules rapping low boiling point solvents with vinyl chloride type resin are mixed into the various fiber materials and fixed on the fiber materials with macromolecular coagulant. After forming these foamed fiber materials like a diaphragm and drying the sheet, these thermal expansion microcapsules are foamed at about 260°C. Thus, the various fiber materials such as highly elastic fibers 1, pulp 2 and synthetic fibers 3 are fused mutually through the foaming agent 4.

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CASE # 10/560,777

DERWENT- 1985-072527  
ACC-NO:  
DERWENT- 198512  
WEEK:

CASE # 10/560,777

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TITLE: Loudspeaker diaphragm comprising carbon fibre -reinforced-polyethylene sheet thermally welded to foam core sheet (J5 29.8.81)

PRIORITY-DATA: 1980JP-011060 (January 31, 1980)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
JP 85007439 B	February 25, 1985	JA
JP 56109097 A	August 29, 1981	JA



APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 85007439B	N/A	1980JP-011060	January 31, 1980
JP 56109097A	N/A	1980JP-011060	January 31, 1980

INT-CL-  
CURRENT:

TYPE	IPC DATE
CIPP	<u>B32 B 5/18</u> 20060101
CIPS	<u>H04 R 31/00</u> 20060101
CIPS	<u>H04 R 7/02</u> 20060101
CIPS	<u>H04 R 7/10</u> 20060101

Derwent Accession Number - NRAN (1):

1985-072527

Title - TIX (1):

Loudspeaker diaphragm comprising carbon fibre -reinforced-polyethylene sheet thermally welded to foam core sheet (J5 29.8.81)

Standard Title Terms - TTX (1):

LOUDSPEAKER DIAPHRAGM COMPRISE CARBON FIBRE REINFORCED POLYETHYLENE SHEET  
THERMAL WELD FOAM CORE

DERWENT- 1983-797610  
ACC-NO:  
DERWENT- 198343  
WEEK:

CASE # 10/560,777

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TITLE: Diaphragm for speaker has UV curing resin layer with reinforced member provided on both surfaces of foamed sheet of thermoplastic resin.  
NoAbstract Dwg 0/3

PRIORITY-DATA: 1982JP-037729 (March 9, 1982)

PATENT-FAMILY:

PUB-NO PUB-DATE LANGUAGE  
JP 58154996 A September 14, 1983 JA



APPLICATION-DATA:

PUB-NO APPL-DESCRIPTOR APPL-NO APPL-DATE  
JP 58154996A N/A 1982JP-037729 March 9, 1982

INT-CL-  
CURRENT:

TYPE	IPC DATE
CIPP	H04 R 7/02 20060101
CIPS	H04 R 7/12 20060101
CIPS	H04 R 7/18 20060101

Derwent Accession Number - NRAN (1):

1983-797610

Title - TIX (1):

Diaphragm for speaker has UV curing resin layer with reinforced member provided on both surfaces of foamed sheet of thermoplastic resin. NoAbstract Dwg 0/3

Standard Title Terms - TTX (1):

DIAPHRAGM SPEAKER ULTRAVIOLET CURE RESIN LAYER REINFORCED MEMBER SURFACE FOAM SHEET THERMOPLASTIC NOABSTRACT

PAT-NO: JP02007221417A  
DOCUMENT-IDENTIFIER: JP 2007221417 A  
TITLE: LOUDSPEAKER DIAPHRAGM

CASE# 10/560,777

PUBN-DATE: August 30, 2007

INVENTOR-INFORMATION:

NAME	COUNTRY
YAMANAKA, SHINICHI	N/A
INABA, ATSUSHI	N/A
TAKEWA, HIROYUKI	N/A
AKIYAMA, AKIHIRO	N/A
FUKUSHIMA, SHOZO	N/A

ASSIGNEE-INFORMATION:

NAME	COUNTRY
MATSUSHITA ELECTRIC IND CO LTD	N/A

APPL-NO: JP2006039006  
APPL-DATE: February 16, 2006

INT-CL-  
ISSUED:

TYPE	IPC DATE	IPC-OLD
IPCP	H04R9/00	20060101 H04R009/00
IPFC	H04R7/04	20060101 H04R007/04

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a loudspeaker diaphragm capable of constituting a thin loudspeaker in which a high limit frequency is expanded as to a speaker diaphragm for a thin loudspeaker to be used for various image/acoustic apparatuses.

SOLUTION: The loudspeaker diaphragm is constituted of an approximately plane diaphragm 501, a spiral planar voice coil 504 formed at least on one surface of the diaphragm 501 and a reinforcing wire 121, formed on the inner periphery of the planar voice coil 504 separately from the voice coil 504. Since the reinforcing wire 121 also is formed on the plane diaphragm 501, in addition to the voice coil 504, the loudspeaker diaphragm can contribute to the thinning of a speaker as a loudspeaker diaphragm of superior shape rigidity.

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8/3K/3 (Item 3 from file: 348) [Links](#)

## EUROPEAN PATENTS

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00712878

**A loudspeaker and a method for producing the same**

Lautsprecher und Verfahren zu seiner Herstellung

Haut-parleur et procede de sa fabrication

**Patent Assignee:**

- **MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.;** (216880)  
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(Applicant designated States: all)

**Inventor:**

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- **Shimizu, Toshihiro**  
3-1, Sakuramachi; Matsusaka-shi, Mie-ken; (JP)

**Legal Representative:****Kugele, Bernhard et al (51545)**

Novagraaf SA 25, Avenue du Pailly; 1220 Les Avanchets - Geneva; (CH)

	Country	Number	Kind	Date	
Patent	EP	675667	A2	19951004	(Basic)
	EP	675667	A3	20030219	
Application	EP	95104716		19950330	
Priorities	JP	9462669		19940331	
	JP	9475829		19940414	

**Specification: ...OF THE INVENTION** 1. Field of the Invention:

## 2. Description of the Related Art:

Figure 1 is a half cross-sectional view showing a configuration for a typical loud **speaker** 20. Figure 2 is an exploded perspective view showing details of the loud **speaker** 20. The same constituent elements are indicated by the same reference numerals in Figures 1 and 2.

As shown in Figures 1 and 2, the loud **speaker** 20 includes a lower plate 3 integral with a center pole 2, a magnet ring...  
...as the elasticity modulus E increases and as the density ( $\rho$ ) decreases. Such a loud **speaker** is capable of reproducing sounds in a higher frequency range and therefore realizing a broader reproduction range.

Moreover, the diaphragm... ..of the above, a principal material used for the diaphragm 8 of the conventional loud **speaker** 20 is paper which is composed mainly of natural pulp such as wood pulp. This... ..is required to withstand a large input signal applied thereto. In order for a loud **speaker** to have good resistance for such a large input, the voice coil 9 is required... ..a metal foil, e.g., aluminum, bent into a cylindrical shape. Kraft paper 14 is **wound**, for **reinforcement** and insulation, around an outer periphery of the voice **coil** 9 where a **coil** 15 is not **wound**. The bobbin 13 is obtained by **winding** the voice **coil** 9 on a portion of the bobbin 13 where the kraft paper 14 is not... ..temperature.

Recently, there has been a trend for using metals such as aluminum or organic **foams** for the material of the **diaphragm** 8, instead of the above-mentioned paper. However, organic foams have low elasticity and cannot... ..large. Therefore, these substitute materials for paper are not optimum materials for diaphragms of loud **speakers** for use in **acoustic** apparatuses.

8/3K/5 (Item 2 from file: 349) [Links](#)

PCT FULLTEXT

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00903728

**ACOUSTIC LOUDSPEAKER**

ENCEINTE ACOUSTIQUE

Patent Applicant/Patent Assignee:

- **BABB LABORATORIES**; 6618 Briarhaven Drive, Dallas, TX 75240

US; US(Residence); US(Nationality)

Legal Representative:

- **HUBBARD Marc A(et al)(agent)**

Munsch Hardt Kopf &amp; Harr, P.C., 4000 Fountain Place, 1445 Ross Avenue, Dallas, TX 75202-2790; US;

	Country	Number	Kind	Date
Patent	WO	200237894	A2-A3	20020510
Application	WO	2001US45185		20011030
Priorities	US	2000244430		20001030
	US	2001288284		20010502

**ACOUSTIC LOUDSPEAKER****FIELD OF THE INVENTION**The invention relates, in general, to **acoustic loudspeakers**.**BACKGROUND OF THE INVENTION**

To provide the greatest listening pleasure, an **acoustic loudspeaker** must meet several basic requirements. First, a **loudspeaker** must accurately reproduce very low frequencies, such as bass notes below 40 Hz, which are felt more than heard by most listeners. Second, **loudspeakers** must accurately reproduce overtones of high frequencies. Third, a **loudspeaker** should have a relatively flat frequency and phase response over the full range of audible... ..e., from approximately 30 Hz to 20,000 Hz, in order to produce high-fidelity **sound**. Fourth, to provide a wide dynamic range, a **loudspeaker** must handle signals with power sufficient to reproduce low frequencies at loud volumes without distortion to the **sound** or damage to the **speaker**.

A conventional **acoustic transducer** has a relatively stiff or rigid diaphragm which reciprocates along a linear axis. For reproducing... ..it may be flat or convex. To vibrate the diaphragm, an electrical signal representing the **sound** wave to be reproduced flows through a coil mechanically connected to the diaphragm. The coil... ..a fixed magnetic field, causing the coil to reciprocate with changes in the current. The **coil** is formed from one or more lengths of **wire wrapped** around a **support** structure. Typically, the edges of the diaphragm are attached to a basket shaped frame using... ..a cylindrically shaped pole and a donut-shaped magnet assembly.

Therefore, to **sound** low notes with great volume a **speaker** must be capable of handling a lot of power, mechanical stresses from the strong electromagnetic... ..through a large diaphragm and its natural resonances. A smaller diaphragm could be used to **sound** bass notes, but a longer throw or stroke of the coil would be required to... ..made to accommodate the demands of high and low frequencies in a single, broad band **acoustic** driver, particularly in the area of reducing the mass of the moving parts of the... ..which aids in moving the coil long distances when using a longer throw coil to **sound** bass notes. A low friction bearing can also be added around the circumference of the top end of the post. Lightweight, stiff metal alloys have been used to form diaphragms. **Coil** forms (structures for **supporting windings of coils**) have been made from high **strength**, thermally resistant materials such as KAPTON®. To provide a low mass, compliant suspension for the **diaphragm**, a stamped synthetic **foam** having a very low density with good dampening and resonance characteristics is used.